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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,909	02/19/2004	Garth L. Wilkes	01640397AA	7573

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EXAMINER

FEELY, MICHAEL J

ART UNIT	PAPER NUMBER
1712	

DATE MAILED: 04/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

LD

<b>Office Action Summary</b>	<b>Application No.</b> 10/780,909	<b>Applicant(s)</b> WILKES ET AL.	
	<b>Examiner</b> Michael J. Feely	<b>Art Unit</b> 1712	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 and 20-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 20-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Pending Claims***

Claims 1-15 and 20-26 are pending.

### ***Previous Claim Rejections - 35 USC § 102***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. The rejection of claims 16-19 under 35 U.S.C. 102(b) as being anticipated by Brindoepeke et al. (US Pat. No. 5,344,897) has been rendered moot by the cancellation of claims 16-19.
3. The rejection of claims 1-3, 6-15, and 25 under 35 U.S.C. 102(b) as being anticipated by Brindoepeke et al. (US Pat. No. 5,344,897) has been withdrawn.

### ***Previous Claim Rejections - 35 USC § 103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. The rejection of claims 4 and 5 under 35 U.S.C. 103(a) as being unpatentable over Brindoepeke et al. (US Pat. No. 5,344,897) in view of December et al. (US Pat. No. 6,471,843) ***stands for the reasons of record*** (rejection reiterated below).
6. The rejection of claims 20-24 under 35 U.S.C. 103(a) as being unpatentable over Brindoepeke et al. (US Pat. No. 5,344,897) in view of Whelan et al. (US Pat. No. 3,072,613) ***stands for the reasons of record*** (rejection reiterated below).

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear what is meant by “a monomeric functionalized oil,” and the specification fails to clarify the meaning of this term. This could mean a number of things, such as, (1) an oil with a single functional group, (2) an oil containing functional groups that are pendant or terminating groups, wherein the functional groups are monomeric, and (3) an oil containing functional groups incorporated into the main chain, wherein the functional groups are monomeric.

For the purpose of the prior art search, this limitation has been interpreted to mean any functional group, so long as it is not oligomeric or polymeric. This functional group can be pendant, terminating or incorporated into the main chain as a co-monomer.

***Claim Rejections - 35 USC § 103***

9. Claims 1-3, 6-15, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brindoepe et al. (US Pat. No. 5,344,897).

Regarding claims 1-3 and 6, Brindoepe et al. disclose: (1) a method of making a monomeric functionalized *compound*, comprising the steps of: carbonating a *polyepoxide compound* (column 2, lines 54-64), wherein a monomeric functionalized *compound* is produced

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(column 2, lines 54-64); **(3)** wherein the carbonating step includes reacting *polyepoxide compound* with carbon dioxide (column 2, lines 54-64); and **(6)** wherein the *polyepoxide compound* is converted to a carbonated *compound* without any significant side reactions occurring (column 2, lines 54-64: *silence regarding side reactions suggests that these side reaction inherently do not take place*).

Brindoepe et al. do not explicitly disclose that the *polyepoxide compound* is: **(1)** an epoxidized vegetable oil, wherein a carbonated vegetable oil is produced; **(2 & 3)** wherein the epoxidized oil is epoxidized soybean oil (ESBO), and the produced carbonated oil is carbonated soybean oil.

Rather, they disclose a coating composition that uses a polyepoxide as a precursor material (column 1, lines 27-34). The list of candidate polyepoxides includes:

- a. polyglycidyl ethers based on polyhydric alcohols, phenols, hydrogenation products of these phenol and/or novolacs (column 1, line 43 through column 2, line 6);
- b. polyglycidyl ethers of polycarboxylic acids (column 2, lines 7-17);
- c. polyepoxides of (a) and (b) mixed with one another or as a mixture with monoepoxides (column 2, lines 18-29);
- d. epoxides containing amide or urethane groups (column 2, lines 30-33);
- e. epoxide compounds derived from unsaturated fatty acids, preferably linseed oil and soya oil (column 2, lines 34-42); and
- f. ***instead of the polyepoxide compound, reaction products thereof with CO<sub>2</sub> can also be employed. In addition to epoxide groups, these products also contain 1,3-dioxolan-2-one groups (cyclic carbonate groups), which can be reacted with primary***

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*amines to form urethanes. Depending on the molar ratios of polyepoxide compound and CO<sub>2</sub>, the reaction with CO<sub>2</sub> gives compounds which no longer contain epoxide groups or compounds which contain epoxide groups and cyclic carbonate groups*  
(column 2, line 54-64).

Based on the context of (f), it appears that any of polyepoxides (a) through (e) would have been considered as suitable candidates to undergo the carbonation reaction. Furthermore, it appears that the molar ratios would have been obviously selected/controlled to ensure that significant side reactions did not occur.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use epoxidized vegetable/soybean oil in the carbonation reaction set forth in Brindoepe et al. because Brindoepe et al. disclose a number of suitable polyepoxide candidate materials, including epoxidized vegetable/soybean oil.

Regarding claims 7, Brindoepe et al. are as set forth above (*see rejection of claims 1-3 and 6*) and incorporated herein to meet the limitations of claim 7.

Regarding claims 8-15, Brindoepe et al. are as set forth above (*see rejection of claims 1-3, 6, and 7*) and incorporated herein to meet the limitations of claims 8-15.

Regarding claims 25, Brindoepe et al. are as set forth above (*see rejection of claims 1, 3 and 6-15*) an incorporated herein. Brindoepe et al. disclose: (25) a polyurethane network produced from their carbonated epoxide compounds (column 2, lines 55-58). It appears that

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such a reaction product would have inherently formed a *nonisocyanate* polyurethane network.

Regarding claim 26, Brindoepe et al. are as set forth above (*see rejection of claims 1, 3, 6-15, and 25*) an incorporated herein. Brindoepe et al. do not explicitly disclose (26) carbonation at atmospheric pressure. However, atmospheric pressure is accepted in the chemical arts as a default reaction parameter unless otherwise specified. Where the broad teachings of Brindoepe et al. do not specify pressure conditions, it would appear that atmospheric pressure was used.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use atmospheric pressure in the method of Brindoepe et al. because Brindoepe et al. fail to specify otherwise.

10. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brindoepe et al. (US Pat. No. 5,344,897) in view of December et al. (US Pat. No. 6,471,843).

Regarding claims 4 and 5, Brindoepe et al. are as set forth above; however, they do not explicitly disclose (4) the use of a catalyst or (5) more specifically a tetrabutylammonium bromide (TBAB) catalyst for the carbonation reaction.

December et al. also disclose a reaction of an epoxy-functional compound with carbon dioxide, resulting in an expansion of the epoxide ring, forming a cyclic carbonate. Their reaction is performed in the presence of a tetra ammonium bromide catalyst (column 16, lines 52-62).

This disclosure demonstrates that catalysts, and more specifically TBAB, are known in the art as suitable catalytic materials for performing this ring expansion (carbonation) reaction.

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These catalysts would have been suitable regardless of the backbone of the epoxy-functional compound because only the epoxide functions are involved with the reaction. In light of this, it has been found that selection of a known material based on its suitability for intended use supports a *prima facie* obviousness determination.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a catalyst, and more specifically a TBAB catalyst, in the reaction of Brindoepeke et al. because December et al. disclose that TBAB is known in the art as suitable catalytic material for performing the ring expansion (carbonation) reaction set forth in Brindoepeke et al.

11. Claims 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brindoepeke et al. (US Pat. No. 5,344,897) in view of Whelan et al. (US Pat. No. 3,072,613).

Regarding claims 20-24, Brindoepeke et al. disclose: **(20)** a method of making a nonisocyanate polyurethane network comprising mixing (1) a carbonated vegetable oil and (2) a *primary amine* (column 2, lines 34-43 and 54-64); and **(22)** wherein the carbonated vegetable oil is a carbonated soybean oil (column 2, lines 34-43 and 54-64).

Brindoepeke et al. do not explicitly disclose: **(20)** (2) an amine having a functionality of at least two; **(21)** wherein the carbonated vegetable oil and amine are mixed stoichiometrically at or within nearly balanced stoichiometrically; **(23)** wherein the amine is selected from the group consisting of ethylenediamine (ED), hexamethylenediamine (HMD), and tris(2-aminoethyl) amine (TA); and **(24)** wherein a viscous solution is produced from the mixing, and the viscous solution is transferred to a mold, followed by curing.

Whelan et al. disclose a method of forming a resinous polyurethane product (claims) by



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reacting cyclic carbonates (*produced by reacting an epoxy-functional compound with carbon dioxide*) (column 2, lines 41-56) with primary aliphatic diamines (*including ethylenediamine and hexamethylenediamine*) (column 3, lines 47-53), in essentially equimolar proportions so that the highest molecular weight products are produced (column 3, lines 70-73). The resulting materials, “are readily cast into tough, colorless films having excellent clarity and tear resistance by extrusion or solvent casting techniques,” (column 1, lines 52-54).

The teachings of Whelan et al. demonstrate that diamines, such as ED and HMD, are known in the art as suitable primary amines used for forming a polyurethane from a carbonated epoxy-functional compound featuring cyclic carbonate groups. These diamines would have been suitable regardless of the backbone of the carbonated epoxy-functional compound because only the cyclic carbonate groups are involved with the reaction with the amines to form the polyurethane. In light of this, it has been found that selection of a known material based on its suitability for intended use supports a *prima facie* obviousness determination.

Whelan et al. also provide motivation to use equimolar proportions, resulting in the highest molecular weight compounds. Furthermore, they demonstrate that these types of polyurethanes are mold-curable, resulting in the formation of tough, colorless films having excellent clarity and tear resistance.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use ED or HMD as a primary diamine in equimolar stoichiometric proportions and to cure the reaction mixture of Brindoepe et al. in a mold because Whelan et al. demonstrate that ED and HMD are known in the art as suitable primary amines used for forming a polyurethane from a carbonated epoxy-functional compound featuring cyclic carbonate groups;

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wherein stoichiometric ratios of these compounds are preferred to yield the highest molecular weight compounds. Furthermore, they demonstrate that these types are polyurethanes are mold-curable, resulting in the formation of tough, colorless films having excellent clarity and tear resistance.

### *Response to Arguments*

12. Applicant's arguments, see pages 5 & 6, filed December 20, 2004, with respect to the rejection(s) of claim(s) 1-3, 6-15, and 25 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

The previous rejection under 35 U.S.C. 102(b) over Brindoepe et al. was not proper; however, an obviousness rejection under 35 U.S.C. 103 is both appropriate and necessary for the reasons set forth above. The following are responses to issues raised by the Applicants:

- *Argument 1: Brindoepe does not disclose carbonating an epoxidized vegetable oil:*

Applicants feel that Brindoepe et al. exclude the use of epoxidized fatty acid derivatives in the carbonation reaction. After further analysis of the reference, there appears to be no such exclusion. All of the polyepoxide compounds, including the epoxidized fatty acid derivatives, appear to be considered as suitable candidates for this carbonation reaction. These carbonated materials are presented as alternatives to the non-carbonated materials.

- *Argument 2: Brindoepe fails to teach "a monomeric functionalized oil":*

Applicants claim that Brindoepe et al, do not teach a carbonated vegetable oil that is "a monomeric functionalized oil". The examiner respectfully disagrees. This term is quite broad, and it appears that the obvious reaction product taught by Brindoepe et al. would have inherently satisfied this description.

- *Argument 3: The technology of Brindoepeke differs from Applicant's invention:*

Applicants invention is broadly claimed to encompass all technology involving these materials, including the technology set forth in Brindoepeke et al. Brindoepeke et al. eventually use this material as a precursor for a coating material; however, they still teach the material.

- *Argument 4: Brindoepeke fails to teach the absence of significant side reactions:*

The Examiner agrees that this limitation is not explicitly taught; however, it appears to be inherently present or obviously achieved by controlling molar ratios, as discussed in Brindoepeke et al.

- *Argument 5: Brindoepeke fails to disclose a "nonisocyanate" polyurethane network:*

The Examiner agrees that his limitation is not explicitly taught; however, it appears that such a reaction product would have inherently formed a *nonisocyanate* polyurethane network – *see column 2, lines 55-58.*

13. Applicant's arguments, see pages 6-8, filed December 20, 2004, with respect to the rejection(s) of claim(s) 4 & 5 under 35 U.S.C. 103 have been fully considered; however, they are not persuasive.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the

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applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicants also go into a detailed discussion with regards to the examples of both Brindoepeke et al. and December et al. Applicants suggest that the subject matter set forth in the Examples demonstrate the vast differences in the references, which makes them improperly combinable. Applicants are reminded that "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)).

Clearly, the cited portions of Brindoepeke et al. do not represent their preferred embodiments; however, they are still valid teachings.

The teachings of December et al. have been used to shed light on the reaction mechanism that Brindoepeke et al. describes with very little detail. These teachings demonstrate that catalysts, and more specifically TBAB, are known in the art as suitable catalytic materials for performing this ring expansion (carbonation) reaction. These catalysts would have been suitable regardless of the backbone of the epoxy-functional compound because only the epoxide functions are involved with the reaction. The citations of December et al. accomplish this, even without anything "instructive to say about when and how to use TTAB".

In light of the above remarks, the rejection is indeed proper.

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14. Applicant's arguments, see pages 8-9, filed December 20, 2004, with respect to the rejection(s) of claim(s) 20-24 under 35 U.S.C. 103 have been fully considered and are not persuasive.

Applicants begin by attacking the teachings of Brindoepeke et al., again citing the Examples. Once again, Applicants are reminded that "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). They continue by arguing that Whelan is not related in any way to the instant invention or to the teachings of Brindoepeke et al.

Clearly, the cited portions of Brindoepeke et al. do not represent their preferred embodiments; however, they are still valid teachings. They explicitly disclose, *In addition to epoxide groups, these products also contain 1,3-dioxolan-2-one groups (cyclic carbonate groups), which can be reacted with primary amines to form urethanes* – see column 2, lines 55-58. The urethanes mentioned by Brindoepeke et al. appear to have nothing do with their main objective; however, these teachings are valid, regardless of where they fall within the patent.

The teachings of Whelan et al. have been used to demonstrate that diamines, such as ED and HMD, are known in the art as suitable primary amines used for forming a polyurethane from a carbonated epoxy-functional compound featuring cyclic carbonate groups. These diamines would have been suitable regardless of the backbone of the carbonated epoxy-functional compound because only the cyclic carbonate groups are involved with the reaction with the amines to form the polyurethane.

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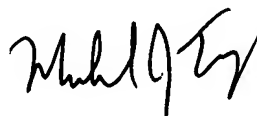
In light of the above remarks, the rejection is indeed proper.

***Communication***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is 571-272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael J. Feely  
Primary Examiner  
Art Unit 1712

March 31, 2005